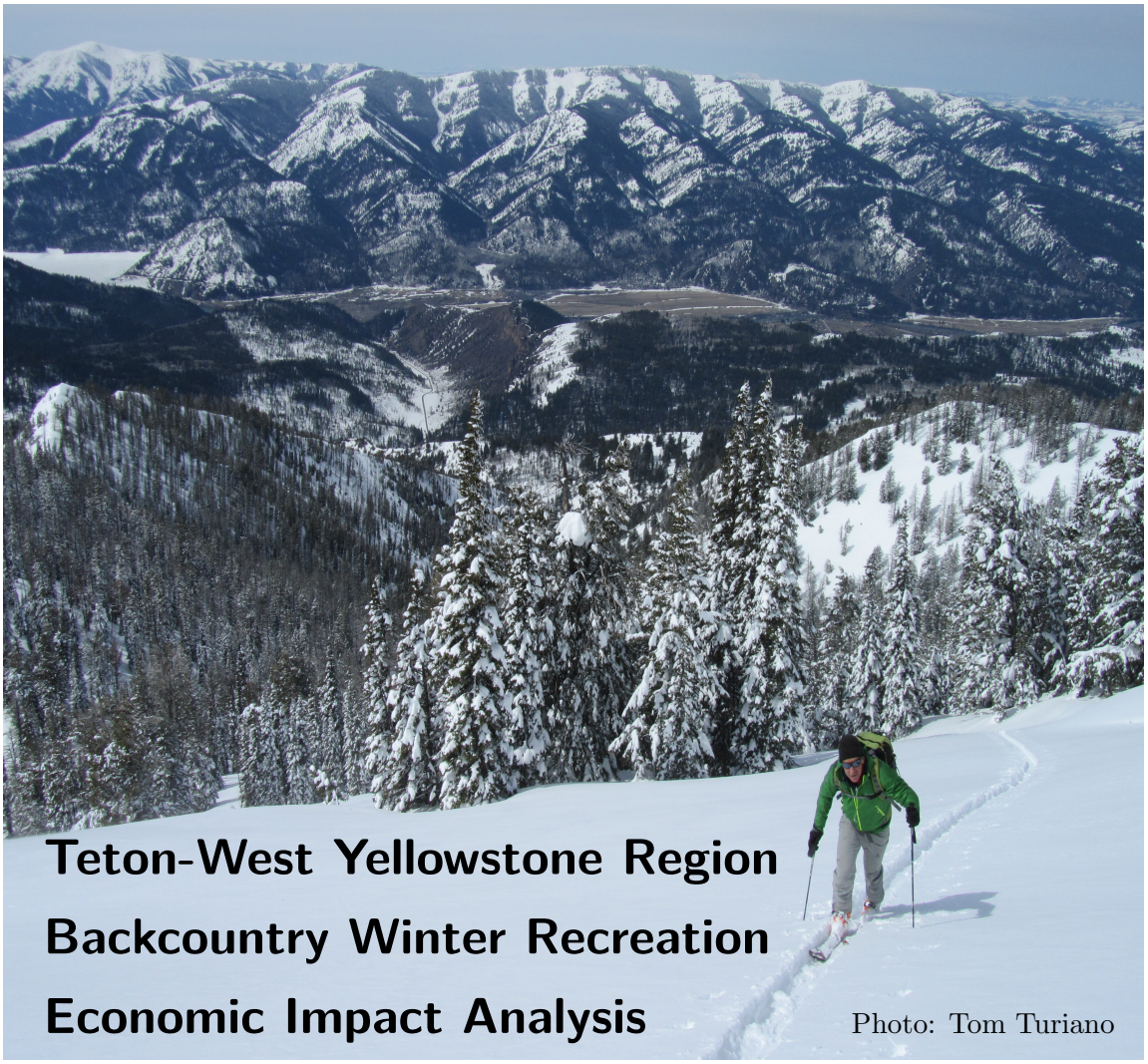

Executive Summary

WINTER WILDLANDS ALLIANCE

Mark Newcomb
November, 2013

Summary

This report presents the results of a study that analyzed the annual economic contribution of winter backcountry recreation in Grand Teton National Park, parts of the Bridger-Teton and Caribou-Targhee National Forests, and areas around West Yellowstone in Gallatin National Forest and Yellowstone National Park. The economic activity impacts communities in Teton County, Wyoming; Teton, Bonneville, Fremont and Madison Counties, Idaho; and West Yellowstone, Montana. We define backcountry recreation to include backcountry skiing and snowboarding (aka AT); cross-country and nordic track skiing; snowshoeing; walking/jogging on groomed backcountry trails; and over-snow biking. The population includes residents of the communities in the region who participated in one or more of those activities as well as nonresidents who participated in one or more of those activities during the course of their visit. We gathered data via surveys administered to a random sample of residents and nonresidents over the course of the 2012/2013 winter season. We estimated the population by aggregating Federal Lands Recreation Enhancement Act data, National Visitor Use Monitoring Data, Grand Teton National Park trail counts and concessionaire use data. We find the total annual direct economic contribution of these activities in the region to be $22,564,461. We estimate the annual direct economic impact by nonresidents who participate in these activities while visiting the region to be $12,073,815. We estimate the annual economic contribution of residents to be $6,473,919. We estimate that this economic activity annually generates $2,974,004 in wages to employees who work in jobs directly stemming from these forms of winter backcountry recreation. And we estimate that this activity annually contributes $1,042,723 in tax revenues to state and local government.

Mark Newcomb contracted with **Winter Wildlands Alliance** to undertake this study. Winter Wildlands Alliance (WWA), is a national non-profit organization dedicated to promoting and preserving winter wildlands and quality human-powered snowsports experiences on public lands. WWA has a collective membership of over 25,000 individuals and 35 grassroots member groups in 11 states. Mark Newcomb is an economist with experience in environmental economics, energy infrastructure, urban and rural planning, GIS and spatial analysis. He has an MS in Economics and Finance from the University of Wyoming and twenty-five years experience backcountry skiing and working as a backcountry ski guide and avalanche course instructor.

Contents

1 Introduction

This paper presents the results of a regional economic analysis of winter backcountry recreation, largely of the non-motorized nature. Activities include backcountry skiing and snowboarding (aka AT); cross-country skiing both on and off of groomed trails; snowshoeing; walking/jogging on groomed backcountry trails; and over-snow biking. The region of interest encompasses Grand Teton National Park, parts of the Bridger-Teton National Forest and Caribou-Targhee National Forest, and areas around West Yellowstone (located on the Gallatin National Forest). The population of interest includes residents of Teton County, Wyoming; Teton, Bonneville, Fremont and Madison Counties, Idaho; and West Yellowstone, Montana who participate in those forms of winter recreation. The target population also includes nonresidents who participated in winter backcountry recreation during the course of their visit. Over the course of the 2012/2013 winter season we surveyed a random sample of resident and nonresident backcountry visitors who walked or jogged, cross-country skied, snowshoed, backcountry skied (aka AT) or fat-tire biked at least once during the season. The survey asked for data about annual expenditures on goods and services related to these forms of backcountry recreation, as well as the location and frequency of backcountry visits. It also contained questions meant to assess satisfaction levels with various elements of the winter backcountry recreation experience. We applied estimates based on this data to populations of resident and nonresident backcountry visitors estimated via a combination of data sources, including Federal Lands Recreation Enhancement Act (FLREA) data, USDA Forest Service National Visitor Use Monitoring (NVUM) data, trail counts and authorized concessionaire use data from both Grand Teton National Park and the Forest Service.

We also surveyed retailers in the region that sell gear, clothing and other goods and services related to winter backcountry recreation. This data provides important information about employment and wages related to winter backcountry recreation, and it helps corroborate our population estimates. A third survey targeted organizations such as backcountry guide services and avalanche course providers, both for-profit and nonprofit, that operate as authorized concessionaires on National Forest or National Park lands. This data also provided important information about the economic contribution of the recreational activities targeted in our study.

Anecdotal evidence suggests that winter backcountry recreation is increasing throughout the study region, bolstered by developments in gear technology and a growing body of

publicity about the quality of the experience.[1] The amount, quality and ease of access to public lands managed by the USDA Forest Service and National Park Service in the region is certainly an important, if not the most important, factor behind this rise in popularity. And partnerships between the Forest Service and local trails and pathways organizations support grooming of trails for cross-country skiing, snowshoeing, walking and fat-tire biking that further enhances the winter backcountry recreation experience in the region.

Economic impact analyses are commonly used to quantify the dollars spent within a defined region as a result of a certain activity or group of activities. As in White and Stynes (2010), we note the distinction between impact and contribution—the former is spending in the region from forest visitors outside the region while the latter is spending by forest visitors from within the region. In general, spending by backcountry users within the region is considered a valid contribution to the local economy if it would not occur without access to the backcountry.[2]

2 Economic Contribution of Winter Backcountry Recreation

We find the total annual direct economic contribution of these activities in the region to be $22,564,461. We estimate the annual direct economic impact by nonresidents who participate in these activities while visiting the region to be $12,473,919. We estimate the annual economic contribution of residents to be $6,473,919. We estimate that this economic activity annually generates $2,974,004 in wages to employees who work in jobs directly stemming from these forms of winter backcountry recreation. And we estimate that this activity annually contributes $1,042,723 in tax revenues to state and local government. We conservatively estimate that 7,419 residents of the region participate in winter backcountry recreation in the region and that 41,336 nonresidents participated in winter backcountry recreation during the course of their visit to the region. We estimate that the 7,419 residents participating in winter backcountry recreation spend an average of $803 annually in region and an additional $255 out-of-region on goods and services for backcountry winter recreation. Our per-person spending estimate for the 41,336 nonresidents is $273 per person per visit on backcountry winter recreation goods and services during their visit.

[1] See, for example, Schnitzpahn (2012) and Rendezvous Ski Trails (2012). Indeed winter recreation visitation is so intense in some areas that it is leading to congestion Pearlman (2008).

[2] On one hand, the type of person who recreates in the backcountry (relatively active and physically fit) would substitute some other form of active recreation in place of backcountry recreation (i.e., they would spend money on recreation with or without access to public lands. On the other hand, many would have never moved to the region without such access.

Table 2.1 presents the overall results of our economic analysis of winter backcountry recreation in a specific region incorporating parts of northwestern Wyoming, Eastern Idaho and the town of West Yellowstone, Montana. The results are based on survey data gathered over the winter of 2012/2013. These results are applied to population estimates made using Federal Lands Recreation Enhancement Act data; Grand Teton National Park trail counts and concessionaire use data; Bridger-Teton 2008 National Visitor Use Monitor data; and 2010 Caribou-Targhee National Visitor Use Monitor data.

Table 2.1: **Total estimated economic contribution of winter backcountry recreation in the Teton-West Yellowstone region.**

Expenditures, Residents	$6,473,919
Expenditures, Nonresidents	$12,073,815
Expenditure, Total	$18,547,734
Wages, Guiding	$826,301
Wages, Retail	$2,147,703
Wages, Total	$2,974,004
State and Local Tax Revenues	$1,042,723
TOTAL	$22,564,461

To put this in perspective, Kaliszewski (2012) found that summertime trail use of the trails system in Teton County, Wyoming resulted in $18,496,495 of economic activity (2010 dollars). She concluded that about 1,439 locals used the trails and spent about $784,255. She estimated that 105,430 non-locals used the trails and spent about $168 per day, which amounted to $17,712,240 in total spending. She estimated that this economic activity generated $1,109,790 in state and local taxes, 194 jobs and $3,598,045 in wages and salaries.

Taylor et al. (2013) calculated a statewide estimate of the year-round economic contribution of non-motorized trail use specifically on Forest Service Lands within the state of Wyoming. They attributed $55.1 million in direct economic activity to non-motorized trail use. Using IMPLAN software, they estimated that non-motorized trail use resulted in $67,901,054 total direct and indirect impacts, generated 600 jobs and generated $17,785,359 in wage income. This study was based entirely on NVUM data for both visitation and spending and included both summer and winter trail use, though did not distinguish between the two.

Trout Unlimited (2005) estimated that anglers, residents and nonresidents alike, spend

$423 million in all of Wyoming. And Loomis (2005) estimated that boating and fishing on a region including the Henry's Fork and South Fork of the Snake River, as well as Southwest Wyoming, generated $46 million (2005 dollars) in current income and creates 1,460 jobs.

Finally, we note that this study measures only the direct economic contribution of backcountry recreation. It stops short of estimating the indirect and induced economic impacts generated via the multiplier effect. Furthermore, the visitor use and economic impacts estimated for West Yellowstone only include data for Rendezvous Ski Trails and not for winter backcountry recreation in adjacent Yellowstone National Park except as noted in Section 2.2 below.

2.1 Economic Contribution by Region

This section summarizes the economic contribution of each sub-region based on the population estimates as outlined in Section 3.3. We infer the probability that a backcountry visitor visited one, some combination of any two, or all three subregions based on our sample data. We use inclusion/exclusion to calculate the final percentage excluding those who were double counted, then apply the result to the population as a whole.

2.1.1 Economic Contribution: Grand Teton National Park

As calculated based on trail counts and commercial visits reported by concessionaires, Grand Teton National Park attracted approximately 1,883 local backcountry visitors and 3,722 non-local visitors. However the number of local visitors must be adjusted for double counting of those who visited more than one subregion.The adjusted total is 1,603. Based

Table 2.2: **Expenditures by local visitors attributable to Grand Teton National Park.**

	Gear	Fees	Snowmobile Access	Total
Per Person	$805.43	$122.74	$3.26	$931.42
Std. Error of Mean	$94.62	$29.51	$2.86	$107.90
Median	$813.00	$80.00	$0.00	$948.00
Sample Total	$248,071	$37,805	$1,003	$286,878
Population Total	$1,291,127	$196,762	$5,220	$1,493,104

on these numbers and the sample spending per person for locals and non-locals who visited

GTNP, the estimated contribution to the local economy was $2,357,587. We attribute $1,493,104 of that to locals (Table 2.2) and $864,483 of it to non-locals (Table 2.3).

Table 2.3: **Expenditures by non-local visitors attributable to Grand Teton National Park.**

	Gear	Fees	Food & Lodging	Total
Per Person	$55.21	$3.50	$173.53	$232.23
Std. Error of Mean	$43.80	$4.91	$86.31	$104.69
Median	$35.00	$0.00	$373.00	$455.00
Sample Total	$7,343	$465	$23,079	$30,887
GTNP Total	$205,520	$13,015	$645,948	$864,483

2.1.2 Economic Contribution: Bridger-Teton and Caribou-Targhee National Forests

Within the study region, National Forest Lands in the Bridger-Teton and Caribou Targhee attracted approximately 5,689 local backcountry visitors and approximately 36,388 non-local visitors. After accounting for the double counting of local visitors who visited more than one subregion, we estimate the number of local visitors for which expenditures should be calculated to be 4,845. Based on 4,845 locals and 36,388 non-locals, the contribution

Table 2.4: **Expenditures by local visitors attributable to Bridger-Teton and Caribou-Targhee National Forests.**

	Gear	Fees	Snowmobile Access	Total
Per Person	$702.88	$106.94	$21.96	$831.78
Std. Error of Mean	$77.99	$22.21	$26.18	$92.52
Median	$750.00	$66.00	$0.00	$880.00
Sample Total	$326,841	$49,725	$10,210	$386,776
Population Total	$3,405,156	$518,054	$106,372	$4,029,582

to the regional economy attributable to winter backcountry recreation on Forest Service lands in the study region was $14,795,713. We attribute $4,029,582 of that to locals (Table 2.4) and $10,766,131 to non-locals (Table 2.5).

Table 2.5: **Expenditures by non-local visitors attributable to Bridger-Teton and Caribou-Targhee National Forests.**

	Gear	Fees	Food & Lodging	Total
Per Person	$103.02	$8.19	$184.66	$295.87
Std. Error of Mean	$39.23	$7.29	$67.21	$83.33
Median	$75.00	$0.00	$172.50	$354.38
Sample Total	$13,908	$1,105	$24,929	$39,942
Population Total	$3,748,820	$297,846	$6,719,465	$10,766,131

2.1.3 Economic Contribution: Rendezvous Ski Trails

We calculated expenditures attributable to Rendezvous Ski Trails (RST) based on our estimates of how many residents bought day passes, how many nonresidents bought day passes, how many residents bought individual season passes and how many residents bought family season passes. We added to this our estimate of expenditures on lodging made by regional residents from outside the immediate vicinity of West Yellowstone (i.e., Jackson, Victor, Driggs area) who overnighted in West Yellowstone. Finally, we accounted for the double counting of residents who recreated at RST and at other backcountry areas throughout the region. Details of our calculations for RST are given in several tables in the full report. Rather than recreate them here, we summarize our results.

Based on our visitation estimates according to pass sales as recorded by GNF Staff (2013), we calculate the economic contribution of RST to be approximately $1,394,434 over the course of the 2012/2013 season.[1] Of this amount, expenditures by non-locals ($359,967), lodging expenditures by locals who overnight in West Yellowstone accounted ($58,948), and lodging expenditures attributable to the Yellowstone Ski Festival ($83,235)—amounting to $502,149—should be counted as a direct economic impact to West Yellowstone.[2]

2.2 Economic Impact of Commercial and Organizational Use

Public lands within the Teton-Yellowstone region sustain a substantial business community oriented towards people who wish to experience the backcountry under the leadership or tutelage of a professional. The expenditures of participants in organized winter backcountry

[1] If population estimates are based on trail counts rather than pass sales, the contribution could be as high as $2,137,804.

[2] Using the higher population estimates based on skier counts, the total economic contribution would be $2,054,570 with $731,632 in direct economic impacts.

activities, as well as the wages and revenues generated by this activity, are an important part of the overall economic contribution of winter backcountry recreation to the region. We contacted and sent surveys to all 11 guide services, outfitters and providers of outdoor leadership and wilderness education that operate in the region. Six responded. We averaged the per-visit revenue earned by these six for six different guided or instructional activities: AT, cross-country skiing, snowshoeing, mountaineering, avalanche education and outdoor leadership training.[3]

We multiplied those averages by the number of organized visits undertaken for each activity as reported by BTNF and CTNF Staff (2012) and GTNP Staff (2013). Altogether we estimate that participants in commercial activities and education programs spent 6,699 days in the backcountry and $1,652,602 over the course of the 2012/2013 winter season. Of this amount approximately $1,578,069 in gross revenues went to organizations based in the region. Based on this amount of gross income, we estimate that guide services and avalanche course providers are responsible for $826,301 in wages.[4]

Another source of spending related to organized backcountry recreation in Yellowstone National Park are snowcoach tours offered by Yellowstone Vacations that depart from West Yellowstone. The owner doesn't track sales of snowcoach rides used specifically for accessing Yellowstone Park's backcountry. He estimated that customers spend $4,500 dollars a season for private coach rides to go cross-country skiing or snowshoeing in Yellowstone Park. And he estimated that six to eight customers per week, at $114 each, bring their skis or snowshoes along on the trip to make excursions into the backcountry where time permitted during the snowcoach tour. Over the course of a 13 week operating season, this would amount to between $13,392 and $16,356. Since our study did not evaluate whether these customers paid for snowcoach rides specifically for the opportunity to snowshoe or ski tour, or whether they would have paid for snowcoach rides regardless, and since the owner's estimate of the private business was his 'best guess,' we didn't include these revenues in the final estimate of the total economic contribution of backcountry recreation in the region.

2.3 Economic Contribution: Backcountry Recreation Related Retail

Summer and winter backcountry activity supports a substantial amount of retail activity throughout the study region. We view top line sales as another way to estimate the

[3] Hereafter referred to as 'organizations,' and their use as 'organized use.'

[4] Based on the author's experience as a former part-owner of a local guide service, as the operations manager for another ski guide service, and working in a family run provider of avalanche courses, wages amount to 50-60% of gross revenues for these kinds of businesses.

direct economic contribution of winter backcountry recreation and as a way to corroborate our survey data and population estimates. Stores participating in our survey recorded total top-line sales of $6,508,189 in goods and services (including shop repairs and rentals) related to winter backcountry recreation.[5] Employment directly related to sales of winter backcountry gear would generate approximately $2,147,703 in wages based on the rule of thumb that wages amount to a third of gross revenues in this type of retail business Leeds (2013).

Sales data also enables us to corroborate our estimates of the regional populations of resident and non-resident winter backcountry visitors. Based on our sample, about 61% of those sales ($3,954,425) were to full-time or seasonal residents, and about 39% ($2,553,764) were to non-residents. In-region spending on gear and rentals was about $679 per person for residents and about $80 per person for non-residents. Dividing top line sales by their respective per person estimates, we estimate that 5,823 residents and 31,783 nonresidents bought gear in the region during the 2012/2013 season. Given that not all shops responded to the survey, and that not all members of the population bought gear during the past 12 months, these figures roughly corroborate our regional population estimates of 7,419 residents and 41,336 non-residents who use the backcountry for winter backcountry recreation.

3 Study Design and Methodology

3.1 Terms

In our study, the term 'winter backcountry recreation' is used as the catch-all term for the six activities listed in the introduction: backcountry skiing, cross-country skiing on and off of groomed trails, snowshoeing, walking/jogging on groomed trails, and fat tire biking. It does not include the use of motorized vehicles exclusively for recreation sake. However we do include the use of snowmobiles to access more remote backcountry areas for alpine touring (i.e., backcountry skiers park the snowmobile and access their touring objective under their own power). 'Local visitors' are residents of the region or seasonal residents (i.e., they live in the region as defined in Section 3.2 for at least the duration of the 2012/2013 winter season). 'Nonlocal' or 'nonresident' visitors are backcountry visitors who come from outside the region. Helpful acronyms include the following:

GTNP Grand Teton National Park.

BTNF Bridger-Teton National Forest.

[5] This includes sales and rentals of fat tire bikes

CTNF Caribou-Targhee National Forest.

NVUM National Visitor Use Monitoring Program—the program carried out by the USDA Forest Service to estimate use and economic activity related to the use of National Forest lands nationwide.

RST Rendezvous Ski Trails.

AT Alpine touring—a term used to describe skiing or snowboarding in the backcountry, ascending under one's own power.

3.2 Geographic Region

The study focused on winter backcountry recreation that takes place on a swath of public lands renowned for the quality of its winter recreation amenities. Straddling three states, the region includes the Snake River Range, portions of the Wyoming Range and Gros Ventre Range, portions of the Absarokas, the entire Teton Range, and areas around the town of West Yellowstone. We calculated the economic contribution of the activities listed above on communities lying within Teton County, Wyoming; Teton, Bonneville, Madison and Fremont County, Idaho; and the town of West Yellowstone, Montana. The population of interest is comprised of residents and nonresidents who use those lands. Residents are those who reside full time, or resided for the 2012/2013 winter season, in the geographic region defined by the counties and towns listed above. Nonresidents include anyone who visited those public lands for one or more of the types of winter recreation listed above, and who came from outside the region.

To estimate the population of winter backcountry visitors, we broke the backcountry regions into three subregions, each under its own jurisdictional authority: Rendezvous Ski Trails, National Forest lands bordering the western and southern flanks of the Teton Range, and Grand Teton National Park. Visitation to Rendezvous Ski Trails is overseen by staff at the Gallatin National Forest. Backcountry lands on the west side of the Tetons in the second subregion are administered by staff at the Caribou-Targhee National Forest. Backcountry lands on the east side of the Tetons are administered by staff at the Bridger-Teton National Forest. And backcountry lands in Grand Teton National Park are of course administered by Grand Teton National Park personnel. Each entity contributed important data regarding winter backcountry visitation.

3.3 Population Estimate

We conservatively estimate that 7,419 residents of the region participate in winter backcountry recreation in the region and that 41,336 nonresidents participated in winter backcountry recreation during the course of their visit to the region. Estimating the total population of backcountry visitors is the biggest hurdle faced by studies of this type. We corroborated our estimate using retail spending data, and we cross-checked it with results from another study done for the BTNF.[1] See the full report for further details.

To arrive at our population estimate, we applied trail count and/or National Forest NVUM data specific to each of the three subregions. We then aggregated the data and accounted for the double counting of visitors who recreate across two or more subregions. The total combined population of winter backcountry visitors who cross-country ski, AT ski, snowshoe, walk or fat tire bike is thus the sum of the population from each sub-region, minus those who recreate in any two subregions, plus those who recreate in all three.[2]

We estimate that 4,028 nonresidents visited GTNP backcountry; that 36,388 nonresidents visited the BTNF and CTNF backcountry areas within the study region; and that 1,225 nonresidents visited RST. Assuming that zero nonresidents visited more than one subregion, we estimate the population of nonresident visitors to the region to be 41,336.[3]

Table 3.1: **Population estimates by subregion and total after accounting for double counting.**

	Residents:	Nonresidents:
GTNP	1,883	3,722
National Forest	5,689	36,388
RST	1,141	1,225
Sum	8,713	41,336
Pop. Estimate	7,419	41,336

Resident visitors, unlike nonresidents, were asked specifically which trailheads they visited, allowing us to account for double counting. We estimate the overall population of resident winter backcountry visitors (i.e., local visitors, in NVUM parlance) within our study region, in 2012/2013, to have been 7,419. Details of the population estimates for each sub-region are given in the full report.

[1] See Clement and Cheng (2008).

[2] This is based on the counting principal known as inclusion/exclusion.

[3] Because the survey did not ask non-local visitors to specify which trailheads they visited, we have no way of knowing how many visited more than one sub-region while in the region (e.g., Teton Pass in BTNF and Bradley-Taggart in GTNP). However field interviews indicate this is a reasonable assumption.

3.4 Survey and Study Design

We collected data via three different surveys: a backcountry visitor survey designed to estimate overall expenditures by the population of backcountry users, a retailer survey to estimate the overall amount of top-line sales related to backcountry use, and a survey for organizations operating as authorized concessionaires of the National Forest or National Park used to estimate the amount of revenue generated via guided backcountry travel, avalanche education and wilderness travel and leadership training.

To ensure random sampling, we used a stratified design, first designating trailheads as high, medium or low use, then designating weekends and holidays as high use days, and weekdays as low-use days. We thus weighted days and sites according to estimated use levels by first estimating the percentage of overall backcountry use at the seven different trailheads identified for recruitment of respondents. Then we estimated the percentage of use that occurred on weekends versus weekdays. Survey effort was allocated by multiplying those two percentages. Based on this procedure, we determined that survey participants should be recruited in four hour blocks on 30 weekend and holidays and on 50 weekdays. Two people, lead investigator Mark Newcomb, and associate Karl Meyer, undertook the effort of recruiting survey participants by randomly selecting backcountry visitors and asking if they were willing to take a survey online. Printed rack cards describing the study and Winter Wildlands Alliance were handed out to those who requested them. Car counts were taken on several survey days during both the trial and implementation phase of the study, though not on a strictly regimented basis.

Following a three week trial phase in December, we implemented the survey over the course of January, February and March. Preliminary population estimates based on NVUM, National Park, and Rendezvous Ski Trails data indicated that a sample of about 1% of the population would amount to around 500 complete responses. Thus we chose 500 as a target, and ended up with 517 useable responses.

We also announced the study at three large public events focusing on winter backcountry recreation. The first was the Skinny Skis Avalanche Awareness night held at the beginning of December in Jackson, Wyoming. The second two were backcountry ski oriented film festivals held in January (Jackson, Wyoming) and February (Victor, Idaho). Several interested parties became aware of the survey through these announcements and through word of mouth and contacted the lead investigator expressing a desire to take the survey. We randomly selected a third of the completed surveys from this group.

Since the intent of this study is to measure the direct economic contribution of winter backcountry recreation within the region, it was important to parse those expenditures

made within the region from those made outside the region.[4] Hence the survey clearly defined the region and explicitly asked respondents to record expenditures outside the region, whether via on-line transactions or visits outside the region, as well as those expenditures made inside the region. Copies of the survey forms are provided in the appendices of the full report.

4 Survey Results

Following a three week trial phase in December, we implemented the survey over the course of two and a half months in the winter of 2012/2013 (last two weeks of January, February and March). Karl Meyer and Mark Newcomb together made contact with 1,234 winter backcountry users. Of that group, 679 viewed the survey on line, 575 started the survey, and 509 completed the survey. We received 65 complete responses from backcountry users who heard about the survey through word of mouth. We selected a random sample equal to a third of these 65 surveys to arrive at a total of 530 complete surveys compiled for analysis. Out of that number, we eliminated 13 that contained erroneous data across a significant number of questions.

To make it easier for families with common expenditures such as lodging or snowmobiles to calculate expenditures, the survey could be completed for an individual or for a family.[1] The survey later asked respondents to record the number of people for which the expenditure figures apply (i.e., how many people were in the party/family for which the response was submitted). The 357 local responses in aggregate recorded expenditure data for 607 individuals for an average of 1.7 people per response.[2] Most reported for themselves ($n = 196$). For nonresidents, 160 completed responses were received representing 399 individuals. Over 77% of nonresidents chose to answer for more than one person, most were filled out for two people ($n = 72$), and the average number of people per response was 2.4.

4.1 Survey Results: Visitation

Respondents reported a total of 13,616 total visits to the trailheads listed in the survey and an additional 1,850 visits to trailheads or areas not listed in the survey. The breakdown

[4] Kaliszewski (2012) cited difficulties in separating the two.

[1] The USDA National Visitor Use Monitoring program also tracks visitor spending by individual or by party White and Stynes (2010).

[2] Note that because of the way the survey was structured, backcountry use data reflects that of the 357 specific individuals that actually *took* the survey, while expenditure data reflects that of the 607 individuals for which respondents reported data.

of total visits by trailhead (figure 4.1), indicates that Cache Creek and, to some extent, Teton Canyon are more important destinations than Bradley-Taggart for daily or semi-weekly exercise and/or recreation (i.e., they are used more often by fewer respondents). Indeed, the median number of visits per respondent per trailhead was highest for Teton

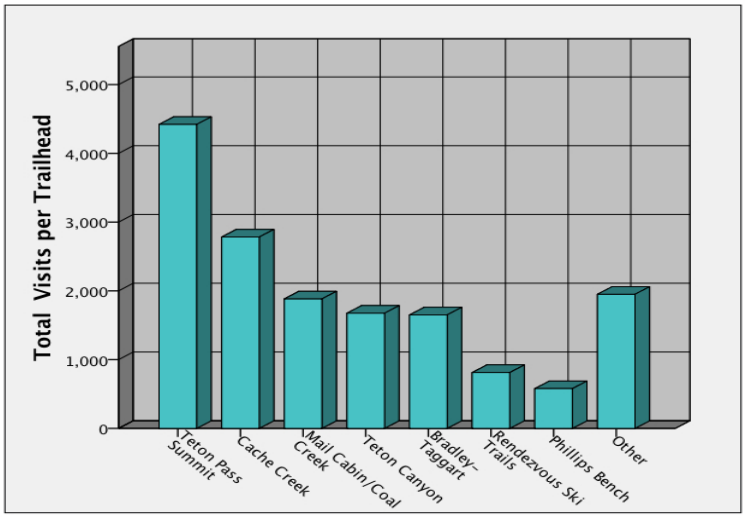

Figure 4.1: Total visits made to each trailhead by the 357 local and seasonal respondents.

Pass at 15. Median visits per respondent to Cache Creek and 'Other' was 10. The median for Teton Canyon was eight; five for Bradley-Taggart, Phillips Bench; and 4 for Rendezvous Ski Trails.

The median value for Rendezvous Ski Trails is biased downward due to the effects of geography as described in section 3.2 above. Residents who live in West Yellowstone registered a median of 50 visits per person. Residents who lived outside of West Yellowstone but in other subregions had a median value of 4 visits.[3]

4.2 Survey Results: Geographic Distribution of Non-Local Visitors

Non-local (nonresident) visitors are those respondents whose home address is outside of the study region but who pursued some form of winter backcountry recreation in the region over the course of the 2012/2013 winter season. One-hundred sixty respondents indicated they were from outside the study region. Two from Idaho Falls responded as non-locals

[3]Three of the 46 who's home address is not specifically in West Yellowstone indicated they visited Rendezvous Ski Trails 70, 31, and 30 times respectively. These three indicated that they are seasonal residents, by all appearances in or near West Yellowstone. Eight other residents indicated they had visited Rendezvous Ski Trails in the past 12 months but did not record the number of visits.

when they should have responded as locals, and four respondents from Bozeman responded as locals when they should have responded as non-locals. Fifteen respondents visited from Bozeman, Montana; nine from the Denver-Boulder, Colorado area; and seven from the Salt Lake City area. Four respondents visited from each of the following areas: Helena and Missoula, Montana; Pocatello, Idaho; and Lander, Wyoming.

Twenty-seven of the 160 visitors that responded to the survey did not record the length of their stay. The 133 that did averaged four days per response (median stay was 3 days). The most common length of stay was two days. The longest stay was for 21 days. Visitors most commonly listed 'Friends' as their means of lodging, followed closely by 'Hotel'—see

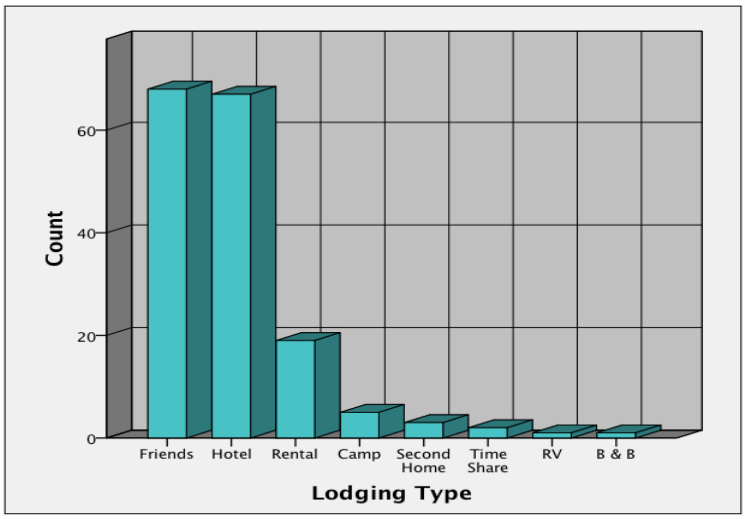

Figure 4.2: Nonresidents: frequency of lodging by type, $n = 158$.

Figure 4.2. According to Pistono (2013), there were 'More out-of-state license plates on Teton Pass than ever before,' perhaps reflecting sub-normal snow levels and conditions in surrounding states—especially Colorado and Utah. Seven chose 'Other' for lodging: three who came and went the same day, two who stayed at a dude ranch, one that slept in their car and one that stayed with family in a condo rented by the family.

4.3 Survey Results: Purpose for Visiting Region

The survey asked visitors to indicate the purpose of their visit and were allowed to pick more than one choice. Visitors primarily came to the region to either AT or cross-country ski. The next most commonly listed 'Primary purpose of visit' was to ski and/or snowboard at one of the region's alpine resorts. Figure 4.3 shows the breakdown of visits by purpose

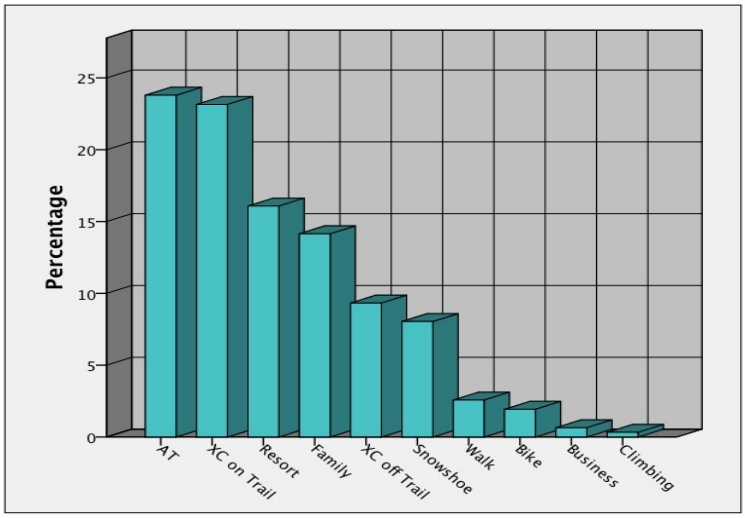

Figure 4.3: Nonresidents: percentage of nonresidents listing each activity as the primary purpose of their visit $n = 160$.

out of 160 total responses.

4.4 Survey Results: Expenditures by Local Visitors

The survey asked residents to record expenditures related to their winter backcountry recreation across 20 different categories: twelve for hard goods such as equipment and clothing; four for entrance fees to parks and trailheads, guide fees, and avalanche course fees and tuition; and four that only applied to owners of snowmobiles who used them for accessing the backcountry expressly for the purpose of backcountry recreation.[4]

Sample results spanned a wide range. On the low end, one resident indicated that they hadn't spent any money, and one indicated they only spent $10 over the past 12 months. On the high end, three individuals reported spending $24,531, $14,600 and $11,739 respectively. We identified these three as outliers and didn't use them in calculations of per-person spending. Identifying contaminants and outliers required judgement. Since purchases of big ticket items have the potential to boost an individual's annual expenditures well above the mean, we chose a conservative method to identify potential outliers by calculating a reference statistic using *per person* expenditures as described in University of Oregon (2013). See the full report for complete data within each category.

[4]One out of the first 12 categories is equipment repairs and ski tunes. Though technically a service, ski tunes and repairs are so closely related to the maintenance and purchase of skis, snowboards and other equipment that they are included in this category.

Expenditures by residents for all goods and services related to winter backcountry recreation both inside and outside the region averaged $1,058 per person—$803 in the region and $255 outside the region (Table 4.1). Within the survey sample, full-time residents on average spent more than seasonal residents ($1,370 vs. $1,047). And residents on average spent more on hard goods in the region than outside the region ($679.06 vs. $254.89).

Table 4.1: **In-region, out-of-region and total annual expenditures by residents.**

	Per Response	Median	Std. Error of Mean	Per Person
In Region	$1,373.61	$850.00	$80.40	$803.35
Out of Region	$435.82	$100.00	$37.85	$254.89
Total	$1,809.43	$1,300.00	$92.15	$1,058.24

Residents spent the most on skis ($277 per person for in-region expenditures), well above the next highest category of clothing ($167 per person). Survey respondents most frequently ($n = 243$) reported expenditures in the miscellaneous category—sunglasses, climbing skins and common items such as sun-screen—followed closely by clothing ($n = 237$)

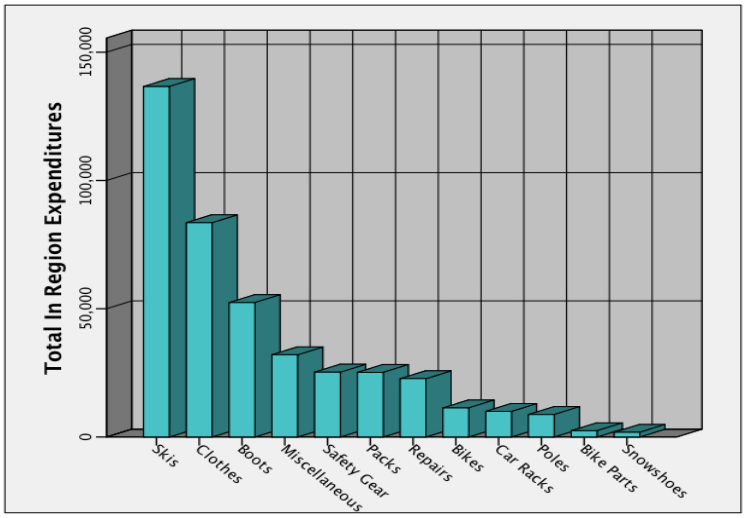

Figure 4.4: Hard-good in-region expenditures by category.

and skis ($n = 203$).

Resident respondents spent $106.30 per person on fees and services. Expenditures were highest ($30.34 per person) for guide and avalanche course fees, followed by entrance fees ($27.92 per person)—Figure 4.5.

Twenty-seven respondents indicated they owned a snowmobile and used it to access backcountry recreation. For each respondent, we weighted snowmobile expenditures according

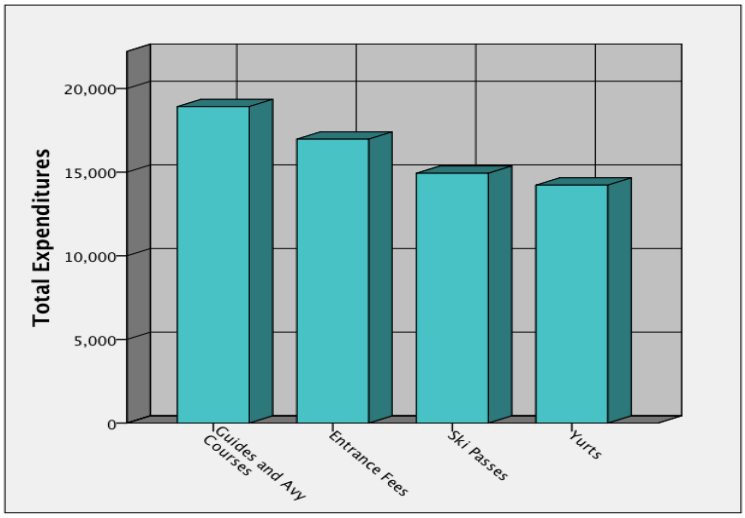

Figure 4.5: Expenditures for guide services, avalanche courses, yurt stays and miscellaneous fees, by category.

to the percentage of days a respondent used snowmobile access (i.e., if 50% of a respondents use of a snowmobile was for access to backcountry AT skiing, then that respondents total snowmobile-related expenditures were multiplied by 50%). Thus calculated, spending on snowmobile access among survey respondents averaged $18 per person (Figure 4.6).

4.5 Survey Results: Expenditures by Non-Local Visitors

The survey asked nonresidents to record their expenditures on the same set of 20 categories of goods and services related to their winter backcountry recreation in the region that were posed to residents, as well as their expenditures on food and lodging while in the region. Of the 160 visitors, 158 recorded expenditures while in the region on goods and/or services related to their winter backcountry recreation. The two who did not, both spent five days in the region. One responded that the primary purpose of their visit was for 'fishing' and visiting family, that they stayed with friends and that they spent four days cross-country skiing. The other visited to ski at a resort and to backcountry ski, spent three days backcountry skiing and indicated that they 'camped.' Most likely they did spend some amount on at least food while in the region and for whatever reason did not record the amount.

We weighted food, lodging and transportation costs incurred during the entirety of a visit according to the percentage of days out of the entire visit spent recreating in the back-country (e.g., if expenditures include lodging at a resort for five nights when only one out

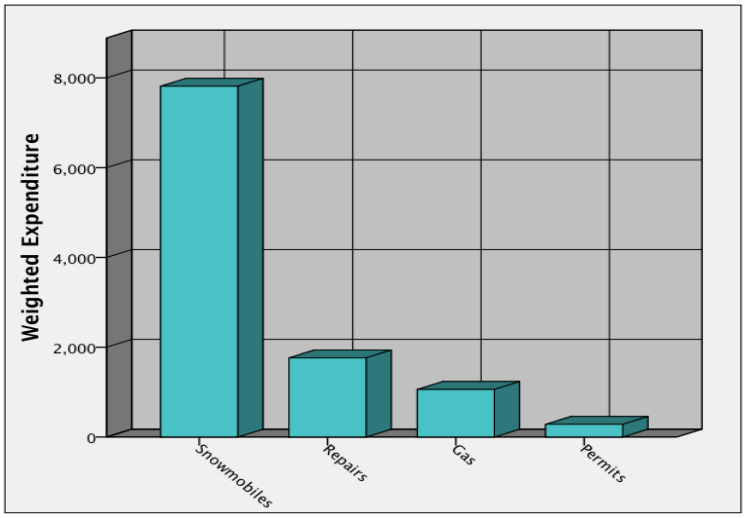

Figure 4.6: Expenditures for goods, services and fees related to snowmobile access, by category.

of the five days was spent backcountry recreating, then it's reasonable to apply one night's worth of expenditures towards backcountry recreation). Thirty-nine percent (63) of the visitors in the survey indicated that they backcountry recreated every day of their visit, 43% (69) recreated less than every day of their visit, and 18% (28) visitors did not record the overall length of their stay but did record the number of days during which they undertook some form of backcountry recreation (total of 99 days). To the extent that some respondents who visited the region specifically to backcountry recreate may have recreated less than 100% of their visit, this method understates the amount of those expenditures that could justifiably be attributable to backcountry recreation—the argument being that since backcountry recreation is why they were here, 100% of their lodging, etc. should be included even if they only backcountry recreated 50% of the time.

We identified seven outlier responses as determined by the process described in the full report, leaving 153 valid responses representing spending for 391 individuals. Average expenditure was $698 per response, or $273 per person. Among the valid responses there were no expenditures made for snowmobile access. Total spending in each category is shown in table 4.2. The full report contains a detailed breakdown of visitor spending by category.

Table 4.2: **Nonresident expenditures (n = 153).**

Category	Per Response	Median	Std. Error of Mean	Per Person
Hard Goods	$205.34	$60	$38.98	$80.35
Fees & Services	$25.58	$0	$4.63	$9.70
Food, Lodging, Transport.	$468.32	$238	$53.21	$183.26
Total	$698.46	$422	$73.13	$273.31

5 Responses to Opinion Questions

In addition to expenditure questions, survey participants were asked a series of questions about their recreation experience. The first question asked about their experience backcountry skiing, snowshoeing, cross-country skiing, walking/jogging on groomed snow trails and/or fat tire biking on groomed snow trails. The next set asked for opinions regarding basic infrastructure and backcountry use statements (e.g., 'Plowed parking areas for winter backcountry recreation are sufficient in size'). The final question was meant to gauge the efficacy of the Teton Pass Ambassador program—a program designed to address congestion and safety concerns for both parking and backcountry recreation.

5.1 Satisfaction Levels

Residents reported a very high level of satisfaction with their backcountry experience in almost all categories. Participants were asked to 'rate your overall level of satisfaction undertaking the following activities....' They were given choices of 'Very Dissatisfied,' 'Dissatisfied,' 'Neither Dissatisfied nor Satisfied,' 'Satisfied,' 'Very Satisfied' and 'NA' (Table 5.1). The percentage of those reporting that they were 'Very Satisfied' with their experience peaked in the AT category where 74% of residents who skied and/or snowboarded in the backcountry in the last 12 months reported that they were 'Very Satisfied,' 20% reported that they were 'Satisfied' and only 5% reported anything less than 'Satisfied.' The percentage of those who reported 'Satisfied' was greater than the percentage of those who reported 'Very Satisfied' in only one activity, fat tire biking where 31% reported they were 'Very Satisfied,' 42% reported they were 'Satisfied,' and 27% reported they were something less than 'Satisfied.'

Nonresidents responded similarly to residents (Table 5.1). As with residents, alpine touring garnered the highest satisfaction rate with 81% of visitors who alpine toured during their

Table 5.1: **Satisfaction rates according to activity—locals.**

	Very Dissat-isfied	**Dissat-isfied**	**Neither**	**Satis-fied**	**Very Satis-fied**
Walking	2%	2%	6%	39%	52%
Snowshoeing	2%	0%	9%	38%	51%
X-country On-trail	2%	2%	4%	32%	59%
X-country Off-trail	2%	0%	4%	31%	62%
Alpine Touring	3%	0%	2%	20%	74%
Snowmobiling	4%	3%	24%	24%	46%
Fat Tire Biking	2%	7%	18%	42%	31%

stay reporting that they were 'Very Satisfied.' Those who cross-country skied on trails also

Table 5.2: **Visitor satisfaction rates according to activity.**

	Very Dissat-isfied	**Dissat-isfied**	**Neither**	**Satis-fied**	**Very Satis-fied**
Walking	2.9%	2.9%	8.6%	37.1%	48.6%
Snowshoeing	0.0%	3.1%	9.4%	28.1%	59.4%
X-country On-trail	4.4%	1.1%	5.5%	16.5%	72.5%
X-country Off-trail	8.2%	2.0%	4.1%	36.7%	49.0%
Alpine Touring	3.8%	1.3%	2.5%	11.3%	81.3%
Snowmobiling	0.0%	0.0%	33.3%	0.0%	66.7%
Fat Tire Biking	0.0%	0.0%	14.3%	28.6%	57.1%

had a high likelihood of reporting that they were 'Very Satisfied.' There were only three non-resident survey respondents who used snowmobiles for accessing the backcountry. Two of them were 'Very Satisfied' with their experience, and one was 'Neither Dissatisfied nor Satisfied.'[1]

5.2 Opinions

Survey participants were next asked how strongly they agreed or disagreed with a series of 12 issues relating to the existing state of backcountry recreation amenities, access and

[1]The use of snowmobiles to access the backcountry requires A. a snowmobile, which nonresident visitors typically don't have access to, and B. localized knowledge of the backcountry. Hence it's not unexpected that the rates of nonresident utilization of snowmobiles for backcountry access is low.

management strategies. Every topic in the list offered respondents a chance to choose from a range of levels from 'Strongly Disagree' to 'Strongly Agree' and then to record the level of importance they attached to that issue, ranging from 'Not Important' to 'Very Important.' There was also an 'N/A' choice. The full report presents detailed results. Table 5.3 presents a summary of the mean levels of importance and agreement ascribed to each issue by residents who responded to the survey.

Table 5.3: **Mean levels of importance and agreement regarding winter backcountry issues among resident survey respondents.**

Issue	Importance	Agreement
Too much area for non-motorized use	4.43	1.50
Too much area for multi-use	3.92	3.08
Parking lots sufficient in size	4.26	3.10
Parking lots sufficient in number	4.20	3.92
Parking lots sufficient in location	4.22	3.21
Sufficient groomed x-country ski trails	4.15	3.96
Sufficient grooming of x-country ski trails	4.08	4.01
Sufficient trails for dog walking	3.72	3.92
Sufficient groomed trails for fat tire biking	2.60	3.40
Signage sufficiently placed and visible	3.83	3.75
Sufficient Forest Service staff in field	3.12	2.93
Sufficient Park Service staff in field	3.07	3.19

Tables 5.3 and 5.4 show the mean levels of importance and agreement among valid, non-'N/A' responses. A non-'N/A' response reflects a level of familiarity and interest in the topic on the part of the respondent. The mean score listed in the tables thus reflects the average opinion among those who took the survey, have knowledge of the topic and have an opinion on that topic. The higher the mean, the higher the level of agreement or importance, depending on what is being asked. For example, someone may choose 1 ('Strongly Disagree') for the statement that 'There are sufficient groomed trails where over-snow (aka fat-tire) biking is allowed,' and then choose 1 ('Not Important') regarding the level of importance they personally assign to that issue. Among both residents and nonresidents, the topic that received the highest mean level of importance was whether or not there is too much area set aside exclusively for non-motorized use (mean = 4.43 and 4.30 respectively). This topic also received the lowest level of agreement (1.50 and 1.43 respectively).

Table 5.4: **Mean levels of importance and agreement regarding winter backcountry issues among nonresident survey respondents.**

Issue	Importance	Agreement
Too much area for non-motorized use	4.30	1.43
Too much area for multi-use	3.95	3.19
Parking lots sufficient in size	4.08	3.33
Parking lots sufficient in number	4.06	3.46
Parking lots sufficient in location	4.14	3.89
Sufficient groomed x-country ski trails	4.45	4.00
Sufficient grooming of x-country ski trails	4.12	3.91
Sufficient trails for dog walking	3.72	3.92
Sufficient groomed trails for fat-bire biking	2.75	3.91
Signage sufficiently placed and visible	3.83	3.80
Sufficient Forest Service staff in field	3.12	2.87
Sufficient Park Service staff in field	3.07	3.19

5.3 Teton Pass Ambassador

A final question in this section asked for opinions regarding the Teton Pass Ambassador program. This program is a partnership between Friends of Pathways and the Forest Service that pays for an ambassador, currently Jay Pistono, to be present on Teton Pass. The ambassador engages with public entering and exiting the backcountry, making them aware of parking lot etiquette, backcountry safety and etiquette and safety precautions when traveling in the backcountry. At times the ambassador helps resolve disputes that arise when parking is tight and trails are crowded.

The survey stated that the 'purpose of the Ambassador Program is to communicate backcountry ethics, safety information, and reduce user conflict on Teton Pass.' It then asked respondents to 'Please rate this program in terms of its *overall effectiveness in meeting this goal*'. The survey presented respondents with six choices: 'Poor,' 'Fair,' 'Good,' 'Excellent,' 'Undecided,' and 'N/A—I'm unaware of the Teton Pass Ambassador Program.'

Residents who responded to the survey gave the program a high rating in terms of effectiveness with over 34% giving it an 'Excellent' rating and another 30% giving it a good rating (table 5.5). Only 4% gave it anything less than a 'Good' rating. The mean effectiveness rating was 3.47, or about half way between 'Good' and 'Excellent.' Almost 23%, or 81 of the 354 valid responses, indicated that they were unaware of the program. When responses are sorted by those that backcountry recreated at Teton Pass less than 25% of the time in the last 12 months, 55 were unaware of the program. In other words, 68% of

Table 5.5: **Resident opinions regarding the Teton Pass Ambassador Program**

Choice	Frequency	Percent	% of Those Aware
Poor	3	0.8%	1.0%
Fair	12	3.4%	4.4%
Good	106	29.9%	38.8%
Excellent	121	34.2%	44.4%
Undecided	31	8.8%	11.4%
Unaware	81	22.9%	—
Total	354	100.0%	100.0%

Table 5.6: **Nonresident opinions regarding the Teton Pass Ambassador Program**

Choice	Frequency	Percent	% of Those Aware
Poor	1	0.6%	1.8%
Fair	7	4.4%	13.3%
Good	25	15.6%	47.1%
Excellent	16	10.0%	30.2%
Undecided	4	2.5%	7.6%
Unaware	107	66.9%	—
Total	160	100.0%	100.0%

the 81 that chose 'N/A, I'm unaware of the program' recreated at Teton Pass relatively infrequently compared to their overall use of the backcountry. Thus the apparently high percentage of respondents unaware of the program may be an artifact of the geographic size of the survey region and breadth of the survey—respondents from West Yellowstone or those that predominantly cross-country ski or walk on groomed trails appear to be less likely to be aware of the Ambassador Program.

Not unexpectedly, almost 70% of nonresidents who took the survey were unaware of the Teton Pass Ambassador Program (table 5.6). Of those who were aware of it, however, the response was largely favorable. Over 30% rated the effectiveness of the program to be 'Excellent' and 47.1% rated the effectiveness to be 'Good.' Only 15.1% rated it 'Fair' or 'Poor.'

6 Conclusion

Public lands in the Yellowstone-Teton region provide exceptional opportunities for winter backcountry recreation. Anecdotal evidence suggests that use of the backcountry for winter recreation is increasing. Space to park at backcountry access points, once plentiful, on many days now requires a wait. Extensive networks of groomed trails supported by

partnerships between the Forest Service and local organizations reflect community support for maintaining opportunities for winter backcountry recreation. And residents and nonresidents alike were very satisfied with the quality, accessibility and variety of winter backcountry recreation opportunities. Winter access to Federal public land is based on land management policies that reflect the mandate of the agency which oversees it. Those policies support extensive winter backcountry recreation, much of it of the non-motorized nature, that directly contributes over $20 million to local communities on an annual basis. The direct economic impact of nonresidents who visit the region and take advantage of these opportunities amounts to over $11 million. Wages comprise almost $3 million of the total, and state and local tax revenues amount to over $1 million of the total.

This study generated a substantial body of data on the annual expenditures of residents and the per trip expenditure by backcountry visitors, data that has never before been gathered. Residents spend on average just over $800 a year in the region for gear, clothing, avalanche education, guide services and outdoor leadership training. Aggregate annual *in-region* expenditures of local backcountry visitors for clothing, gear and services related to their backcountry use is over $6 million. Residents annually spend another $250 outside the region for additional purchases of gear and clothing—of interest because, in this age of on-line shopping, there's a loss of local tax revenue associated with such purchases. Nonresidents participating in winter backcountry recreation in the survey area spend an average of $273 per person per visit on goods and services related to backcountry winter recreation. Nonresidents participating in winter backcountry recreation in the survey area spend an average of $273 per person per visit on goods and services related to backcountry winter recreation.

The sample size is sufficient to use this data to estimate annual expenditures among different subsets within the sample. For example, if a researcher wanted to, she could estimate the annual expenditure of local backcountry visitors who largely cross country ski compared to the annual expenditure of local backcountry visitors who largely backcountry ski. Two other surveys gathered data on regional top-line retail sales of backcountry gear and on gross revenues to organizations providing backcountry guide services, avalanche education and winter outdoor leadership training. Again, this type of data has never been gathered and examined as it has in this study.

Survey data also included opinions regarding several issues related to the quality of the backcountry recreation experience. Not unexpectedly, most survey participants recreate in the backcountry under human power. This type of backcountry visitor feels that the issue of how much public land is set aside for non-motorized recreation is an important issue and that more such land could be set aside exclusively for non-motorized use. That being

said, there is a not insignificant population of backcountry users who avail themselves of motorized transport, usually snowmobiles but also snowcoaches, to reach more remote areas to AT, cross-country ski or snowshoe. By their comments, they feel that more terrain could be opened for multi-use that would include the use of snowmobiles. Their contribution in terms of money spent on snowmobiles and related equipment, in proportion to the amount they use snowmobiles for accessing terrain for backcountry recreation, is included in our estimate of gross expenditures.

This study broke important new ground in helping our community understand the important role of winter backcountry recreation from a purely economic point of view. It shows that people who recreate in the backcountry make a significant contribution to the local economy via their purchase of gear and services related to this recreation. Benefits extend beyond purely economic ones. According to (Robert Wood Johnson Foundation, 2013), Teton County was recently ranked as having the State's best overall health outcomes. While difficult to measure, this is certainly due in part to the availability, quality and ease of access to opportunities for human-powered backcountry recreation. This study is an important first step in creating a foundation for valuing the natural and recreational amenities of the region and understanding the importance of protecting and preserving them.

Acknowledgments: This study owes its existence and success to many individuals dedicated to recognizing the value of the backcountry and preserving our backcountry for future generations. First and foremost, vision came from the leadership at Winter Wildlands Alliance—Mark Menlove, Cailin O'Brien-Feeney, and Forrest McCarthy. Thank you for considerable help in the study design, in editing and providing resources whenever possible. Thank you to the LOR Foundation for funding this first-of-its-kind effort. Huge thank you to Karl Meyer, my associate who did an outstanding job recruiting survey respondents. Thank you to many hardworking and dedicated staff at the Forest Service—Kurt Kleugal, Linda Merigliano, Joanne Girvin, Jay Pence, Ray Spencer, and Dave and Mary Cernicek; and at Grand Teton National Park—Dave Rhinehart, Linda Franklin, Ryan Schuster and Chris Harder; and the Teton Pass Ambassador Jay Pistono. This study could not have been completed without your time and effort in helping with the study design and data. And most of all, thank you to my family—Allison, Charlie and Bowen—who put up with long and odd hours, whether coming home early or late from gathering survey respondents, or putting in weekend time to tabulate the results and finish this report.

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